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*Religion und Christentum*, von PAUL EWALD. Leipzig, 1898. pp. 39.

Christianity is the ideal of all religions, an affirmation of the supersensuous, and based upon an eruption of the supersensuous into earthly life. It is proper, therefore, to speak of its objective basis, and its best definition is communion with God. Christ is its center, and yet throughout it is the true expression of the inner nature and needs of man.

*The Repair of Will-Loss*, by JOHN M. Taylor, M. D.

In these three lectures, which are abstracted and reprinted from the International Clinics, the writer seeks to illustrate how certain differences arising in puzzling medical situations may be met. He assumes that long protracted ill-health is almost sure to end in misconduct. It is difficult to get hold of those who most need medical aid or reproof. The basis of all treatment is nutritional. Every subject requires very special and detailed study and great personal care.

*Early American Philosophers*, by ADAM L. JONES. New York, 1898. pp. 80.

This Columbia University thesis presents a concise account of William Brattle, Benjamin Franklin, Cadwalader, Thomas Clapp, and a fuller characterization of the life, education and opinions of Samuel Johnson and Jonathan Edwards.

*Psychologische Untersuchungen Über das Lesen auf Experimenteller Grundlage*, von BENNO ERDMANN und RAYMOND DODGE. Halle, Max Niemeyer, 1898. pp. 360.

After a brief introductory analysis of the process of reading, the authors résumé the results of previous experimental studies in this field, criticising extensively the work of Cattell, Grashey, Wernicke, and Goldscheider and Müller.

The authors began their experimental study with an investigation of the alternating "reading-pauses" and eye-movements. The eye-movements were observed in a mirror while the subjects (the authors and one other) read familiar or unfamiliar passages from Helmholtz's *Optik* and Lock's *Essay on Human Understanding*. The average angular excursions are found to vary, in the different subjects and texts, from  $3^{\circ}45'$  to  $5^{\circ}$  for comparatively unfamiliar passages, from  $4^{\circ}14'$  to  $5^{\circ}36'$  in familiar passages. They state the number of fixations required in writing, proof-reading, and in reading a foreign language. By telescope observations on reader's eye the first fixation of each line is found to fall within the line, and the last falls still farther within.

Assuming that the results of the measurements of the speed of eye-movements, made by Dodge and others (as described later), are valid for the reading-movement, the authors argue that during  $\frac{1}{11}$  to  $\frac{2}{24}$  of the reading-time the eye remains fixated, and that, during the movement, recognition of letters or words is impossible.

The extent of the "reading-field" is next studied, first by having subjects describe periphery of points fixated on printed page; second, and mainly, by "experimental isolation of the reading-pauses and fields." The projection apparatus used in exposing reading matter is described at length, as is also the Dodge Chronograph used in connection with it and already described elsewhere.

Wishing to make the length of exposure as nearly that of reader's usual fixation as possible, while still excluding reacting eye-movement during exposure, the authors proceed to determine the eye's reaction-time in the following manner: From a point first fixated the subject moved to a second fixation point 12 mm. distant on the appearance there of a small letter c. Simultaneously with this c a large

letter O was exposed so as to fall just within the blind spot with the eye in first fixation, but becoming visible the instant the eye was moved. The length of the O's exposure necessary to make it visible was taken as measure of eye's reaction-time, subject to a slight correction. The minimum time was shown to be between 188 $\sigma$  and 230 $\sigma$ , the experiments not being extensive enough to determine it more definitely.

The experiment is certainly most cleverly planned. The times given seem rather long, and it is to be hoped that other experiments may assure us of their validity.

Exposures for .1 second of letters and words gave results not very different from those obtained by Cattell and Goldscheider in their shorter exposures. Words were read at greater distances and in shorter exposures than letters, and our authors are thus led to argue strongly against the theory of "Buchstabirend Lesen" even in the modified form in which it seemed to have support in the work of Goldscheider and Müller.

The determining-letter theory of the latter is criticised, and the conditions of the reproduction of the "Wortklangbild" are discussed at length.

The authors then make an exhaustive criticism of the "psychological presuppositions for the derivation of psychic times," and later a special discussion of their derivation for the processes in reading.

The results of the psychometric investigations made at Leipzig by Prof. Cattell are subjected to a merciless dissection, and some of the methods and deductions current in psychometry are given a shaking-up which is interesting, to say the least.

The last two chapters report the results of experiments on adequate sound-reactions to printed letters and to words of various lengths and degrees of familiarity. A careful analysis is made of the psychic components of these reactions, and the relations which they bear to the corresponding processes in actual reading.

In an appendix on "the angular speed of eye-movements," after reviewing the work of Volkmann and of Lamansky, the experiments of Dodge are described.

Dodge used a modification of the Helmholtz-Lamansky method of counting the after-images from light stimuli given at regular intervals during the eye's movement. Movements of 5° required 15 $\sigma$ ; 15°, 30 $\sigma$ ; 30°, 50 $\sigma$ , nearly twice the times given by Lamansky.

Dodge's clever extraction of apparently valid results from the misused data given in Volkmann's experiments is deserving of notice.

On the whole, this is by far the best and most extensive work thus far on the Physiology and Psychology of Reading. Though it stop short of much more that is essentially important, it treats the subject in some of its most vital parts, and has many good things which cannot be touched upon here. It is to be regretted that the authors have not practiced the American art of condensing, which might well have given us the book's essentials in not more than half its present bulk.

The unity of the work as a treatise on reading would be much enhanced by relegating to the appendix much of the description of apparatus, and by the separate publication of the "criticism of psychic times."

E. B. HUEY.